## Amendments to the Claims

## 1-3 (Cancelled)

4. (New) A method of determining the presence of radioactive nuclides having a long half-life in a sample, without chemical separation of radioactive nuclides having a short half-life from the sample, comprising:

detecting  $\alpha$ -rays released from radioactive nuclides in a sample using an  $\alpha$ -ray detector over a predetermined time period;

analyzing the detected  $\alpha$ -rays by time interval analysis to identify the portion of  $\alpha$ -rays released from radioactive nuclides having a short half-life;

subtracting the portion of  $\alpha$ -rays released from radioactive nuclides having a short half-life from the detected  $\alpha$ -rays to remove background  $\alpha$ -rays from the detected  $\alpha$ -rays; and

analyzing the remaining  $\alpha$ -rays by pulse-height discrimination to determine the presence of radioactive nuclides having a long half-life.

- 5. (New) The method according to claim 4, wherein the  $\alpha$ -ray detector detects  $\alpha$ -rays as incident pulses and transmits such incident pulses as pulse data to a computer for time interval analysis.
- 6. (New) The method according to claim 5, wherein the computer analyzes the pulse data and plots a time distribution of the pulse data.